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to the average, it is found in practice that some series will become fully charged sooner than others.

The details of the methods of use we hope to publish later. Our illustrations show the battery and street-car of the Electric Accumulator Company; this car, as is well known, calling for no street wires.

MAGNOLIA-METAL.

FOR the last fifty years the soft metal made of copper, regulus of antimony, and tin, invented by Isaac Babbitt of Boston, and named for him, has been in use for the bearings in machinery, as the friction was much reduced by its use.

posed to be the best of their class. The machine used was a 5-inch shaft keyed on a 3-inch shaft lubricated with sperm-oil, 5-inch shaft running in the oil. With light pressure and slow revolutions of shaft, the metals showed little difference, but, with rapid revolutions and heavy pressures, magnolia-metal showed great superiority. The foregoing table shows a detailed statement of the tests, which occupied an hour's time.

The testing-machine consists of a shaft revolving in suitable bearings, between two of which is a steel journal on which the test-piece is placed; the top half only of the bearing being used, which was lined with the metals tested. The brass sets in a frame, to the under side of which is suspended a platform. On

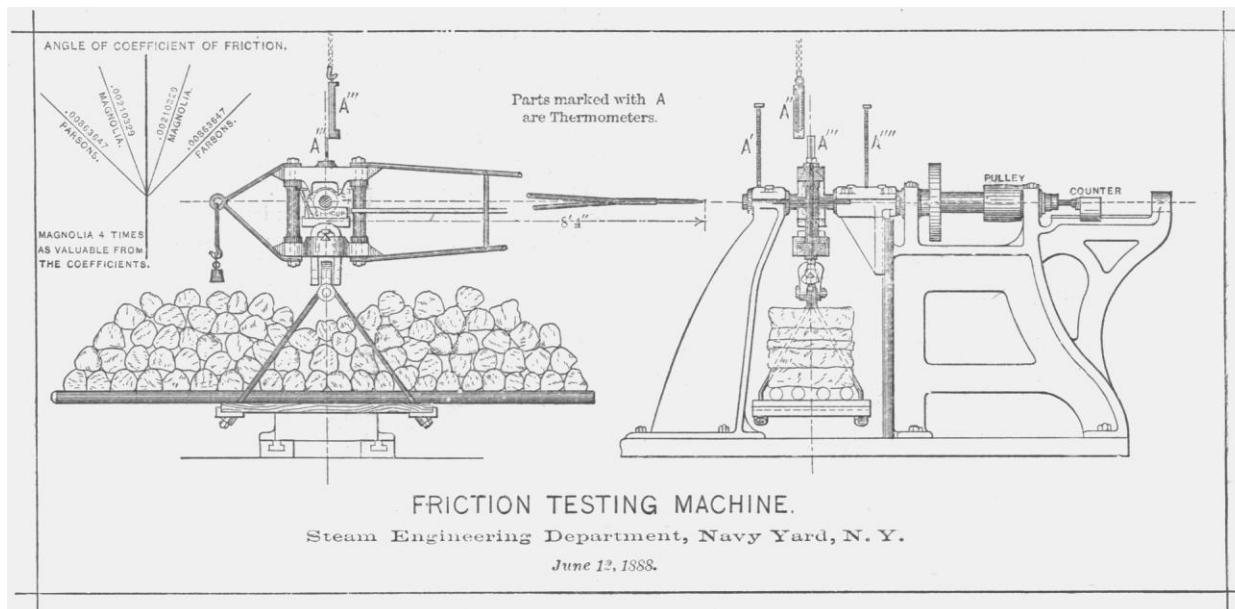


FIG. 1.—APPARATUS USED IN TESTING MAGNOLIA-METAL.

In these days of demand for high speed on railways and in ocean steamers, a diminution of the friction is imperative, and magnolia-metal is offered as furnishing a material for bearings much superior to any thing that has gone before.

this platform the weights are placed for producing the pressure. There are two knife-edges, allowing freedom of the frame, and the weighted platform. A pan beneath the test journal, carrying oil, lubricated the bearing. Thermometers were inserted in the oil-bath and in a recess in the top of the metal. In this machine the co-efficient of friction is obtained by the angle of deviation of the knife-edge from a vertical line passing through the centre of the journal in terms of the radius of the journal, and is independent of the weight entering directly into this calculation.

Other satisfactory tests have been made by the United States Government at the Brooklyn Navy Yard, and by Professor R. H.

Time in Minutes.	Temperature.			Pounds Pressure per Square Inch.	Revolutions of Shaft per Minute.	Speed of Rubbing Surface per Minute.
	Magnolia Anti-Friction Metal.	Hoyt's Genuine Babbitt.	De-Oxidized Genuine Babbitt.			
0	65° F.	90° F.	90° F.	2 gen. Babbs. Magnolia	200 300	1,600 1,550
10	115°	150°	140°		300	2,030 "
20	150°	180°	170°		500	2,030 "
30	160°	230°	230°		800	1,965 "
40	180°	345°	320°		1,000	1,965 "
45		397°			1,000	1,965 "
50	270°		360°		1,000	1,965 "
55			375°		1,000	1,965 "
60	400°				1,000	1,965 "

Magnolia ran full time free without melting out or stopping machinery; Hoyt's melted and stuck to shaft at end of 45 minutes; de-oxidized genuine Babbitt melted and stuck to shaft at end of 55 minutes.

Mr. H. G. Torrey, who has been assayer at the United States Mint, New York, for thirty years, has made several friction tests of journal-bearing metals, the results of which have just been made known. Those selected were magnolia-metal, and Hoyt's genuine Babbitt and the de-oxidized genuine Babbitt, the latter two sup-

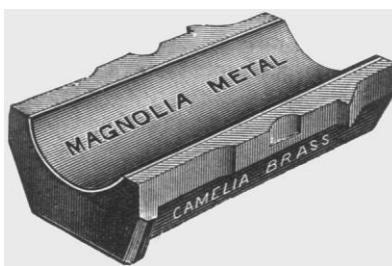


FIG. 2.—MAGNOLIA-METAL BEARING.

Smith of Mason College, Birmingham, England, who reports that his tests show the metal to be superior to either Babbitt or gunmetal, producing less friction, keeping the bearing temperature lower, requiring less lubrication, and possessing greater durability. Professor Smith says that the longer the magnolia-metal bearing is used, and the more severe the duty imposed on it, the better becomes its condition.

Recently this new metal has been introduced in the "City of Paris" and the "Augusta Victoria," contributing its share in the speed developed by these ocean racers.